



1

SEQUENCE LISTING

<110> C. Frank Bennett
Susan M. Freier

<120> ANTISENSE MODULATION OF HKR1 EXPRESSION

<130> RTS-0248

<160> 89

<210> 1
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 1
tccgtcatcg ctcctcaggg 20

<210> 2
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 2
atgcattctg cccccaagga 20

<210> 3
<211> 2772
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (3)...(2096)

<400> 3
ca ggc gcg tta agc tgg ttg gga ccc ggg aag gcc tcc ctc tta agg 47
Gly Ala Leu Ser Trp Leu Gly Pro Gly Lys Ala Ser Leu Leu Arg
1 5 10 15

tct ttc cca cac ctc tgc tcc ttg tta cct gac ttt cgg ctt cag gat 95
Ser Phe Pro His Leu Cys Ser Leu Leu Pro Asp Phe Arg Leu Gln Asp
20 25 30

cgg cgg cgt gca ccc gcg ttc cat ctg tct tct gag act ttg ccc ttc 143
Pro Arg Arg Ala Pro Ala Phe His Leu Ser Ser Glu Thr Leu Pro Phe
35 40 45

tcc agg aag agc act cag gag acc agg aaa atg gct aca ggg ctc ctg	191
Ser Arg Lys Ser Thr Gln Glu Thr Arg Lys Met Ala Thr Gly Leu Leu	
50 55 60	
aga gcc aaa aaa gag gcg ttc gtg gca ttc agg gat gtg gct gtg tac	239
Arg Ala Lys Lys Glu Ala Phe Val Ala Phe Arg Asp Val Ala Val Tyr	
65 70 75	
ttc acc cag gag gag tgg agg ttg ttg agc cct gct cag agg acc ctg	287
Phe Thr Gln Glu Glu Trp Arg Leu Leu Ser Pro Ala Gln Arg Thr Leu	
80 85 90 95	
cac agg gag gtg atg ctg gag act tat aac cat ctg gtc tca ctg gaa	335
His Arg Glu Val Met Leu Glu Thr Tyr Asn His Leu Val Ser Leu Glu	
100 105 110	
att cca tct tct aaa cca aaa ctc att gct cag ctg gag cga ggg gaa	383
Ile Pro Ser Ser Lys Pro Lys Leu Ile Ala Gln Leu Glu Arg Gly Glu	
115 120 125	
gcg ccc tgg aga gag gag aga aaa tgt cca ctg gac ctc tgt cca gaa	431
Ala Pro Trp Arg Glu Glu Arg Lys Cys Pro Leu Asp Leu Cys Pro Glu	
130 135 140	
tcg aag cca gaa att caa ctt agt ccc tcc tgc cct ctg att ttc tcc	479
Ser Lys Pro Glu Ile Gln Leu Ser Pro Ser Cys Pro Leu Ile Phe Ser	
145 150 155	
agt cag caa gct ctc agc caa cat gtg tgg ctg agt cat ctc tct cag	527
Ser Gln Gln Ala Leu Ser Gln His Val Trp Leu Ser His Leu Ser Gln	
160 165 170 175	
ctg ttt tca agt tta tgg gca gga aat cct ctc cac ctg gga aaa cac	575
Leu Phe Ser Ser Leu Trp Ala Gly Asn Pro Leu His Leu Gly Lys His	
180 185 190	
tat cca gaa gat cag aaa caa cag cag gat cca ttc tgc ttt agt ggc	623
Tyr Pro Glu Asp Gln Lys Gln Gln Gln Asp Pro Phe Cys Phe Ser Gly	
195 200 205	
aaa gca gaa tgg att caa gag gga gaa gac tcc aga ctc ctg ttt ggg	671
Lys Ala Glu Trp Ile Gln Glu Gly Glu Asp Ser Arg Leu Leu Phe Gly	
210 215 220	
aga gta agc aaa aat ggc act tca aag gca ctt tcc agc cca cct gaa	719
Arg Val Ser Lys Asn Gly Thr Ser Lys Ala Leu Ser Ser Pro Pro Glu	
225 230 235	
gaa caa cag cca gca cag tcc aag gaa gac aac aca gtg gtg gat ata	767
Glu Gln Gln Pro Ala Gln Ser Lys Glu Asp Asn Thr Val Val Asp Ile	
240 245 250 255	
ggg tcc agc cct gaa cgg agg gca gat cta gag gaa aca gac aaa gta	815
Gly Ser Ser Pro Glu Arg Arg Ala Asp Leu Glu Glu Thr Asp Lys Val	
260 265 270	
ttg cat ggt tta gaa gtc tca gga ttt gga gaa atc aaa tat gaa gag	863
Leu His Gly Leu Glu Val Ser Gly Phe Gly Glu Ile Lys Tyr Glu Glu	
275 280 285	

ttt ggg cca ggc ttt atc aag gag tca aac ctc ctt agc ctc cag aag	911
Phe Gly Pro Gly Phe Ile Lys Glu Ser Asn Leu Leu Ser Leu Gln Lys	
290 295 300	
aca caa act ggg gag aca cct tac atg tac act gag tgg gga gac agc	959
Thr Gln Thr Gly Glu Thr Pro Tyr Met Tyr Thr Glu Trp Gly Asp Ser	
305 310 315	
ttt ggc agt atg tca gtc ctc atc aaa aac cca agg aca cac tct ggg	1007
Phe Gly Ser Met Ser Val Leu Ile Lys Asn Pro Arg Thr His Ser Gly	
320 325 330 335	
gga aag cct tat gtg tgc agg gaa tgt ggg cga ggc ttt acg tgg aag	1055
Gly Lys Pro Tyr Val Cys Arg Glu Cys Gly Arg Gly Phe Thr Trp Lys	
340 345 350	
tca aac ctg atc aca cat cag agg aca cac tca ggg gag aaa cct tat	1103
Ser Asn Leu Ile Thr His Gln Arg Thr His Ser Gly Glu Lys Pro Tyr	
355 360 365	
gtg tgc aag gat tgt gga cga ggc ttt act tgg aag tcg aac ctc ttt	1151
Val Cys Lys Asp Cys Gly Arg Gly Phe Thr Trp Lys Ser Asn Leu Phe	
370 375 380	
aca cat cag cgg aca cac tca ggg ctc aag cct tat gtg tgc aag gaa	1199
Thr His Gln Arg Thr His Ser Gly Leu Lys Pro Tyr Val Cys Lys Glu	
385 390 395	
tgt ggg cag agc ttt agc ctg aag tca aac ctc att acc cac cag agg	1247
Cys Gly Gln Ser Phe Ser Leu Lys Ser Asn Leu Ile Thr His Gln Arg	
400 405 410 415	
gcg cac act ggg gag aag cct tat gtt tgc agg gaa tgt ggg cgt ggc	1295
Ala His Thr Gly Glu Lys Pro Tyr Val Cys Arg Glu Cys Gly Arg Gly	
420 425 430	
ttt cgc cag cat tca cac ctg gtc aga cac aag agg aca cat tca gga	1343
Phe Arg Gln His Ser His Leu Val Arg His Lys Arg Thr His Ser Gly	
435 440 445	
gag aag cct tac att tgc agg gag tgt gag caa ggc ttt agc cag aag	1391
Glu Lys Pro Tyr Ile Cys Arg Glu Cys Glu Gln Gly Phe Ser Gln Lys	
450 455 460	
tca cac ctc atc aga cac tta agg aca cac aca gga gag aag cct tat	1439
Ser His Leu Ile Arg His Leu Arg Thr His Thr Gly Glu Lys Pro Tyr	
465 470 475	
gta tgc aca gaa tgt ggg cgt cac ttt agc tgg aaa tca aac ctc aaa	1487
Val Cys Thr Glu Cys Gly Arg His Phe Ser Trp Lys Ser Asn Leu Lys	
480 485 490 495	
aca cac cag agg aca cac tca ggg gtt aaa cct tat gtc tgc ctg gag	1535
Thr His Gln Arg Thr His Ser Gly Val Lys Pro Tyr Val Cys Leu Glu	
500 505 510	
tgc ggg cag tgc ttt agc ctg aag tca aac ctt aac aaa cac cag agg	1583
Cys Gly Gln Cys Phe Ser Leu Lys Ser Asn Leu Asn Lys His Gln Arg	

515	520	525	
tca cac acg ggg gag aag cca ttt gta tgt acg gag tgt ggg cga ggc Ser His Thr Gly Glu Lys Pro Phe Val Cys Thr Glu Cys Gly Arg Gly 530 535 540			1631
ttt acc cgg aaa tca acc ctg atc acg cac cag agg aca cac tca ggg Phe Thr Arg Lys Ser Thr Leu Ile Thr His Gln Arg Thr His Ser Gly 545 550 555			1679
gag aag cca ttt gta tgt gct gag tgt gga cga ggc ttt aat gat aag Glu Lys Pro Phe Val Cys Ala Glu Cys Gly Arg Gly Phe Asn Asp Lys 560 565 570 575			1727
tcc acc ctc att tca cac cag agg aca cat tca ggg gaa aag cct ttt Ser Thr Leu Ile Ser His Gln Arg Thr His Ser Gly Glu Lys Pro Phe 580 585 590			1775
atg tgc agg gag tgt ggc aga agg ttt cgg cag aag cct aac ctg ttt Met Cys Arg Glu Cys Gly Arg Arg Phe Arg Gln Lys Pro Asn Leu Phe 595 600 605			1823
agg cac aag agg gca cac tca ggt gcc ttt gtg tgc agg gag tgt ggg Arg His Lys Arg Ala His Ser Gly Ala Phe Val Cys Arg Glu Cys Gly 610 615 620			1871
caa ggc ttt tgt gct aag tta act ctc att aaa cac cag aga gca cac Gln Gly Phe Cys Ala Lys Leu Thr Leu Ile Lys His Gln Arg Ala His 625 630 635			1919
gca ggg ggg aag cct cat gtg tgc agg gag tgt ggg caa ggc ttt agc Ala Gly Gly Lys Pro His Val Cys Arg Glu Cys Gly Gln Gly Phe Ser 640 645 650 655			1967
cgg cag tca cac ctc att aga cac cag agg aca cat tca gga gag aag Arg Gln Ser His Leu Ile Arg His Gln Arg Thr His Ser Gly Glu Lys 660 665 670			2015
cct tat att tgc aga aag tgt gga cgg ggc ttt agt cgg aag tcc aac Pro Tyr Ile Cys Arg Lys Cys Gly Arg Gly Phe Ser Arg Lys Ser Asn 675 680 685			2063
ctt atc aga cat cag agg aca cac tca gga tag aaactttatg tgtataggga Leu Ile Arg His Gln Arg Thr His Ser Gly 690 695			2116
atgtggtaca gccttttagcc aggagtcata cttcatcaga caccagagga cacacacagt			2176
gctgtggcctt tttcagccat tgctagatac caaagtggag acattctgtg tgtgattatg			2236
catgagactg tactggtaag acttgatatct ccatccacct gaaggagaat tgctggctca			2296
ttttcaggag ccctgccctt cctcactgtg gatgggtgggt tgtggaaacc cggtcaggta			2356
atgatagtgg caggaggcag tcaaagtccc aggcagatag ggggtgggtac ctggtgaaac			2416
ccaaccttaa agctgaagac agtcccggct aaatcctcat actgaattga gaacctgtct			2476
tcccatttgg tgtgctttcc tccgattgat cccaaccctt cacctatttt acgtatacct			2536

gccccttcct aattggtttt tacactgctg tgcccacctt ttgagtgggtg cctttgcata 2596
 cttacaaatc agtcaacgtg tattccccta ttctgagccc ataaaagacc cagactcagc 2656
 tgcagtgagg agagaaatca ccttgctgtg gaggttgggg accactccct gcattcccctc 2716
 tccactgaga gctgttcttt tgctcaataa aattcttttc taccatcct caccct 2772

<210> 4
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR Primer

<400> 4
 tgaaggagaa ttgctggctc a 21

<210> 5
 <211> 19
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR Primer

<400> 5
 acctgaccgg gtttccaca 19

<210> 6
 <211> 25
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR Probe

<400> 6
 ctgcccttcc tcaactgtgga tgggtg 25

<210> 7
 <211> 19
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR Primer

<400> 7
 gaaggtgaag gtcggagtc 19

<210> 8

<211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR Primer

<400> 8
 gaagatggtg atgggatttc

20

<210> 9
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR Probe

<400> 9
 caagcttccc gttctcagcc

20

<210> 10
 <211> 11173
 <212> DNA
 <213> Homo sapiens

<220>

<400> 10
 aagcttcttg gctctctaag ttttattttc tttcactgt gagaagtact tggctattat 60
 ttcaatattt ttctgtccc ttttactctt tctctcatt ctaggactcc caatttacct 120
 gtatattgga ctgctggaaa tgtgtttctg aagattcata ttgtctcata agcttctggt 180
 catttttctt cagtcttttt tctctttttt gaggggtggg tggatatatg taatttctat 240
 tcttttattt tcaaattcac taatctttct tctttttctg tttgctatta aacctgtcta 300
 gtgaattttt aaatttcagt tgtttttttc tttccccctc cctcctctc cctcctctc 360
 cctccccctc cctccccctc cctccccctc cctccccctc cctccccctc ctcttggttc 420
 tgtgggtttt aggagtgtc tcaggcaaga aagccacaaa caaaattatt acccctttct 480
 gttgcaattt tttgagcata aactcttccc catcttctgg ctggttatgt atattttcca 540
 gtgcctttga gtagttattt gttatatttt atccagtctt attattttct gctgcagggt 600
 tcttgtgacc atttcagtct gctggcattt tcgttagtgg gcttcctcat acttattttt 660
 gaattgattt ttggaaattg cttcaaaatt acagaatatt tgcaaaaata aaaatagtag 720
 aataaatata tatggtgcag tgagttgtat gtggtttgtc cccaccacaa ctcatggtga 780
 aatttaattg ccagtttaac ggtattgaaa ggtggtgggg cctttaagag gtggttggtt 840

gtggcatctc tgccctctcg aatggcttat gcagactggg ttagttcttt tggactgggt 900
 tggttctcgt gagatcaagt tggtataaaa caaggcttcc tctgatgttt ggcctctttg 960
 catgcacttg ctttcccttc ctctttctgc tgtgatttga agcagcatga gaccatcacc 1020
 aaatgggcta ccatccaacc tccagaattg tgagccaaat aaactttttt gtaaattacc 1080
 cagtctcagg tattctgtta tagcaatata aaacagatta agacatatgg catatatgtt 1140
 attatataaa tggcatcata aaatgaccta ctattttact tagtttgctt tatcatttat 1200
 tcatgtgctc ttttgcatgc atacccttcc tcttcccttc ccttttctca gtacatatgt 1260
 atgtatgtgt atatgtatat gtatgttcat atgtgtttgt tttgtttttg tctttgtttt 1320
 tgtttttgtt ttttgagaca gagtctcgt ctgtcaccca ggctggagtg cagtggcacg 1380
 atctcggtc actgcaacct ccgcctcctg ggttcaagcg attctcctgc ctacgcctcc 1440
 caagtagctg ggattacagg tgcacgccac catgcctggc taatttttgt gtttttagta 1500
 gagacagggg ttcaccatgt tagtcaggct ggtcttgaac acctgacctc atgatctgct 1560
 cacctcggtc tcccaaagtg ctgggattac aggcgtgagc caccaccccc ggctgtaag 1620
 tgtttgtttc tgtgaatttt ctaagaatgt cgatattgtc tcatataacc acagtgtggt 1680
 tatcagcctc agtaaaacta actttgatac agtcattttg cctgttatct accattcgta 1740
 ttataatttt gtcaacatat agaataatat ggttttttac tttccagaac ataacttagt 1800
 ccaagggttag ttagttcatt ttcatgtcat gtctataatt attattaagg gaagggaatt 1860
 attatttcaa taatctttct ctgtctttta taacattgac atttcatttg tttatttaat 1920
 ttttagattca gagtgtacat gtgcagggtt gttacatggg tatattatgt aatgctgggg 1980
 tttggggctt ctattgaacc tatcaccaa atagtttaca tagtacctga taggtagttt 2040
 ttcagccctt acctccatcc tttttccctt gttttggagt cccagtgctc tattatttcc 2100
 atctttatgt ccgtgtgtac ccattgttta gtcctactt gtgagaacat aggttatttg 2160
 attttctgtt tctgcattga ttcacttagg atgatggcct ctagctgcat ccattgttgc 2220
 gcagaggaca tgatttcatt cttttttatg gctgcatagt atttcatggg gtgtgtgtac 2280
 cacattttat ttatccagtc cactattgat gggcctatac gaagattcca tgactttgct 2340
 gttgggaata gtgctgcgat aagcatatga gtgcagggtg cttctggtag aacaatttat 2400
 tttcccagtc ttgggattgt tggattgaat ggtagttcta tttttagttc cttgagaaat 2460
 ttccatactg tttgccatac aggttgaact aatttacetg accaccaaca atatataagc 2520
 attccctgtt ctgtgcatcc tactaacat ctgttttttt gtttggttgt ttgtttgttt 2580
 aactttttta taatagccat tctgactggg gtgagatggc ctatcttctt gtgggttttc 2640

ttttcccatc	cttcactggg	accaagatct	ctttgtgggt	gtaatttgta	tttctctgat	2700
gattagtgat	tttgagcatt	ttttatgttt	gctccctggt	tgtgtacctt	cttttgagaa	2760
gtatctgttt	atgtcctttg	ctcacttttt	aatgagggtta	tttgggtttt	tggtgttgat	2820
ttgtttaagt	tccttatggt	tctgcatatt	agtcctttgt	aagatgcatg	gttcgcaa	2880
gctttctccc	attctgtagg	ttgtcttttt	actctgttga	ttgtttcttt	tgcagtgcag	2940
aagctctttt	gcttaattaa	atcatatttg	tccatttttg	tttttggtgc	aatcgctttt	3000
gaggacttag	tcataagttc	tttgccctgg	ccaatgtcca	gagaagtttt	tcctagtttt	3060
cctttaggaa	ttttatagtt	tgagggtctta	catttaagtc	tttcatccat	cttgagttga	3120
tttgtgtata	tgagggggaa	gggtccagtt	tcattctctt	gcatgtggct	ggacagtttt	3180
cccagcatca	tttattgaat	aggggtgtcct	ttccccattg	tttatttctg	tcagctttct	3240
cgtagatcag	ttggtagtag	gtgtgtgggt	ttatttctgg	gttctctggt	ctgttccgta	3300
gatctatatg	tctatttttg	tacttacacc	gtgctgtttc	agttaata	gccttgtagt	3360
atagtcaaag	tcaggtaatg	tgatatttcc	agctttgttc	tttttgttta	ggattgcttt	3420
ggctagtcag	gctttgttgg	tcccatatga	attttagaat	tgttttttct	agttctgtta	3480
gaatgttaga	atgacaaatg	atgttggtaa	tttgatagga	attgcattga	atctgtagat	3540
tgctttgggc	agtatcatca	ttttaactat	attgattctt	aacaatctat	gagcatagaa	3600
tgtttttccc	tttgtgtcat	ctgtgatttc	tttcatcagt	gttttgtagt	tctcctcgca	3660
gagacctttc	acctcttttg	tttgatgtat	tcttaggc	tttgtgtgtg	tttgcattcg	3720
tgtggctatt	gtaaatggga	tcttgttctt	tatttggttc	taagcttgaa	tgttactggg	3780
gtatagaaat	gctattgatt	tttgtacatt	gattttgtat	cctggaactt	tactgaattt	3840
ttttttttaa	tcagggttag	gagtcctttg	gagggacctt	tagagttttc	taggtatagg	3900
attattttct	aggtatagga	ttttctaggt	aaaggattct	tggcgaacag	agataatttg	3960
actccctctt	ttcctatttg	gatgcctttt	atttctctgt	cttgcatgat	tgctttctct	4020
aggacttcca	gtactaagtt	gaatacgagt	ggtgagagca	gacatccttt	tcttgttcca	4080
cttcttaggg	ggaatggttt	cagctttcgc	ccattcagta	tgaagttggc	tgtaggtctg	4140
tcacagataa	ctcttcttat	tttgagggtat	gttcctttga	tgcctagttt	gttaaagatt	4200
tttatcatga	aggggtgttg	gattttatcc	gatgcttttt	ttacatctat	taagatgatc	4260
tttttttttt	tttttttttt	tttttgtttg	agacggagtc	ttgctctgtc	acctgggctg	4320
gagtgcagtg	gcgcgatctc	ggctcactgc	aagctccgtc	tcccagggtc	acactattct	4380

cctgcctcag	cctctctgag	tagctggaac	tacaggcgcc	caccaccaag	cctggctata	4440
tttttgatt	tttttagtag	agatgggggt	tcaccgtggt	ctcaatctcc	tgacctcgtg	4500
atccgcccgc	ctcagcctcc	caaagtgcta	ggattacaag	catgagccac	cacacctggc	4560
cgggtttttgt	ttttaatcct	gtttatgtga	tgaatcacat	ttattgaaca	ctgacatttt	4620
agaatacaat	tcctcagttc	tcactttttt	tttttttctt	ttttgagatg	aagtctcact	4680
ctggttgcta	ggctggagtg	cagtggcgcg	atctcggctc	actgcaacct	ccacctcctg	4740
gtttcaagca	gttctctgcc	tcagcctccc	gattagctgg	gactacaggt	gcgtgccacc	4800
atgcctggct	aagttttgta	tttttagtag	agacaggatt	tcaccatctt	ggccaggctt	4860
gtcttgaact	cttgccctca	ggtgatccac	ccaccttggc	ctcccaaagt	gctgggatta	4920
caggcgtgag	ctaccgcgcc	tggccagttc	tcacttttta	aaatagcttt	actgaggtat	4980
aatttacatg	ccataaaatt	acttattgta	tgtatacagt	tcaatatata	tatatatttt	5040
ttttgagatg	gagtttcact	gttgtagccc	atgctggagt	gcagtggcac	aatctcggct	5100
cactgcaacc	tctgcctcct	gggttcaagt	gattctcctg	cctcagcctc	ccgagtagct	5160
gggattacag	gcatgtacca	ccaggcctgg	ctaattttgt	atttttggtg	aagacagggg	5220
ttctccatgt	tggtcaggct	ggtctcaaac	ttccgacctc	aggtgatccg	ccacctcagc	5280
cttccaaagt	gctgggatta	caggcgtgaa	ccgccgcacc	tggcctgtgt	gtgtacagtt	5340
caataatttt	tagtaaaact	atagagttat	atgattgtca	cctctattca	acattttctgt	5400
cacaccagaa	agttctcatg	tgcccatttg	cattcatccg	tcctcccatc	agaggaaacc	5460
attgatttgt	ttactgtcta	tagatttgct	gtttctagac	gtataagaat	ggcattgtga	5520
aatatatagt	cttttctttt	tttttttttt	agatggagcc	ttgctctgtt	gccaggctgg	5580
aatacagtgg	tgttatatcg	gtcactgca	acctctgcct	cctgggttca	agcaattccc	5640
ctgcctcagc	ctcctgagta	gctgggacta	cagggtgcaca	ccaccacacc	tggctaattt	5700
tttgattttt	agtagagacg	gggtttcacc	atgttggcc	ggatggtctc	aatctcctga	5760
ccttgatgatc	cacccgcctc	agcctcccaa	agtgtcggga	ttacaggcat	gagccaccat	5820
gcctggccct	tttcattgtt	tattaacat	ttgcatactt	tttttagtaa	aatgcctatt	5880
caattctttt	ctttatttta	aaattagatt	gtgttcttat	tgaattgtaa	gaatttttag	5940
tatattctag	acacaagtcc	tatatcaata	taggattttc	agatatttct	ccctgtctgt	6000
ggcttatctt	ttcattttct	caatgggtgc	atttcaggca	caaaagtttt	aaatgctgat	6060
taagttaaac	ttaccaattt	ttaaaatggg	ttgtgctttt	ggtgttgtaa	ctaagaactt	6120
tattcttaac	tcaaggttat	gaagattttc	ttcactgggt	tcttctagaa	gttttacagt	6180

tttagctctt	acatttagag	ctacaatcca	ttttagttaa	tttttatgta	tcaaatgagg	6240
tgaaaatcta	aattcatttt	cttgcataatg	aatattcagt	tgtccttaca	atctcatata	6300
aagagtatcc	ttcctcccat	tgaattacct	tggcaccttt	atcaaaaatc	agctgactgt	6360
gaatctaagt	gttcatttct	agtctcctga	ttttgttcca	tgatctccat	cttctctcta	6420
tgacagtagc	acactatctt	cattactgta	gctttatatt	aagttttgaa	gttagaagta	6480
tacactcccc	aactttattt	tctttttcag	aaattgtttt	gtctatttta	tgtcctttga	6540
atttcaatgt	aagtttttagg	atcagattgt	gaatttccaa	aagggaaaaa	aacccaaaagc	6600
ctgctgtggt	tgtgatacca	tgattatggt	gaatctgcag	ataaattttg	gtgagaatca	6660
ccatcttaat	aatagtaagc	cttccaatct	atgactgtct	ccctatttat	ttggagcttt	6720
aacttcattc	aacaatgttt	gttaattttc	tttttaaaaa	tctttcttct	tttctctctt	6780
tcctttcctt	ttctctttct	cttctctttc	tttcatccca	ctatgttgcc	caaactggcc	6840
tctaacttct	ggcctcaagc	aatcctccca	cctcagcctc	cttaagtgtt	gggattacag	6900
gcatgagcca	ccgtgcccag	ccttaatttt	cagtttacaa	actttgtgct	actttgtcac	6960
atttattcct	tagcatttta	ttatttttat	gctatcgtga	atagtattgt	tttctcagtt	7020
tcatttttag	aatagtcatt	gctagtatat	agaaatataa	ttatttttta	tatatttatc	7080
ttatatgacc	taagtacaat	tatgacttct	agttgctttt	ttgaaatttt	atgcttacaa	7140
aattatataa	tctgtgaaca	agagattttt	tttacttctt	cctttctagt	taagatgcct	7200
ttcattttatt	ttctcctcat	tttgtttgtc	ttctcctttt	tttttttttt	ttttttgaga	7260
cagagtctca	ctgtgtcacc	aggetggagt	gtgggtggcac	gatctcagct	cactgcaacg	7320
tccgcctccg	gggttcaagc	gattctcctg	cctcagcctc	ccaagtagcc	gagactacat	7380
gtgtgtgcta	ccatagccag	ctaatttttc	tatttttagt	ggagacaggg	tttcgccatg	7440
ttggccagga	tggctcfaat	ctcttgacct	cgtgatctgc	ccgcctcggc	ttcccaaagt	7500
gttgggacta	caggcgtcat	aagtttttga	gaacacgtgc	aatatttgcc	acttcttctt	7560
tcttcttctc	cttttcttct	tctctctctt	cctccttctt	cttcttctct	ttctcttctt	7620
cttttctgtg	tctccctctt	ttgaattcaa	ccccttaaaa	aggtaaaaac	cattttttagc	7680
tggcaggcca	tacagaaaca	ggtttcaggc	tggatttggc	ctgtcaggtg	agtttgccaa	7740
ctcctgcaat	agaaaatgta	atgcataggg	ctagacacag	tggcttatgc	ctgtaatccc	7800
agcactttgg	gaggcttagg	ctgacctgag	gtcaggagtt	caagaccagc	ctggcaaaca	7860
cggtaaaact	ctgtctctac	taaaaataca	aaaattagct	gggcgtagtc	ttggacgcct	7920

gtaatcccag	ctactcggga	ggctaaggca	ggagaatcgc	ttgaaccctg	gaggcggagg	7980
ttgcagtgag	ctgagatcgc	accactgcac	tccagcttgg	gtgaaagaaa	gactccgttt	8040
aaaaaaaaaa	acaaaaaaaa	aaaagaaagt	gtaatgcatg	aagtgaaatg	aaaaatagat	8100
gctgggaagg	atgtctaact	gggagatagc	ttgtgatgta	aatatgtaaa	tatattatga	8160
atgaccagtg	ggcaaggcaa	aattgcctac	acagccctac	ctatggcccc	tctgaaaatg	8220
ttctttcttc	agcagaatcg	aagccagaaa	ttcaacttag	tcctcctgc	cctctgattt	8280
tctccagtca	gcaagctctc	agccaacatg	tgtggctgag	tcctctctct	cagctgtttt	8340
caagtttatg	ggcaggaaat	cctctccacc	tgggaaaaca	ctatccagaa	gatcagaaac	8400
aacagcagga	tccattctgc	tttagtggca	aagcagaatg	gattcaagag	ggagaagact	8460
ccagactcct	gtttgggaga	gtaagcaaaa	atggcacttc	aaaggcactt	tccagccac	8520
ctgaagaaca	acagccagca	cagtccaagg	aagacaacac	agtgggtgat	ataggggtcca	8580
gccctgaacg	gagggcagat	ctagaggaaa	cagacaaagt	attgcatggg	ttagaagtct	8640
caggatttgg	agaaatcaaa	tatgaagagt	ttgggccagg	ctttatcaag	gagtcaaacc	8700
tccttagcct	ccagaagaca	caaactgggg	agacacctta	catgtacact	gagtggggag	8760
acagctttgg	cagtatgtca	gtcctcatca	aaaaccaag	gacacactct	gggggaaagc	8820
cttatgtgtg	cagggaatgt	gggcgaggct	ttacgtggaa	gtcaaacctg	atcacacatc	8880
agaggacaca	ctcaggggag	aaaccttatg	tgtgcaagga	ttgtggacga	ggctttactt	8940
ggaagtcgaa	cctctttaca	catcagcgga	cacactcagg	gctcaagcct	tatgtgtgca	9000
aggaatgtgg	gcagagcttt	agcctgaagt	caaacctcat	tacccaccag	agggcgcaca	9060
ctggggagaa	gccttatgtt	tgcagggaat	gtgggcgtgg	ctttcgccag	cattcacacc	9120
tggtcagaca	caagaggaca	cattcaggag	agaagcctta	catttgcagg	gagtgtgagc	9180
aaggctttag	ccagaagtca	cacctcatca	gacacttaag	gacacacaca	ggagagaagc	9240
cttatgtatg	cacagaatgt	gggcgtcact	ttagctggaa	atcaaacctc	aaaacacacc	9300
agaggacaca	ctcagggggt	aaaccttatg	tctgcctgga	gtgcgggcag	tgctttagcc	9360
tgaagtcaaa	ccttaacaaa	caccagaggt	cacacacggg	ggagaagcca	tttgtatgta	9420
cggagtgtgg	gcgaggcttt	acccggaaat	caaccctgag	cacgcaccag	aggacacact	9480
caggggagaa	gccatttgta	tgtgctgagt	gtggacgagg	ctttaatgat	aagtcacccc	9540
tcatttcaca	ccagaggaca	cattcagggg	aaaagccttt	tatgtgcagg	gagtgtggca	9600
gaaggtttcg	gcagaagcct	aacctgttta	ggcacaagag	ggcacactca	ggtgcctttg	9660
tgtgcagggg	gtgtgggcaa	ggcttttgtg	ctaagttaac	tctcattaaa	caccagagag	9720

cacacgcagg ggggaagcct catgtgtgca gggagtgtgg gcaaggcttt agccggcagt 9780
 cacacctcat tagacaccag aggacacatt caggagagaa gccttatatt tgcagaaagt 9840
 gtggacgggg ctttagtcgg aagtccaacc ttatcagaca tcagaggaca cactcaggat 9900
 agaaacttta tgtgtatagg gaatgtggta cagcctttag ccaggagtca tacttcatca 9960
 gacaccagag gacacacaca gtgctgtggc tttttcagcc attgctagat accaaagtgg 10020
 agacattctg tgtgtgatta tgcattgagac tgtactggta agacttgtat ctccatccac 10080
 ctgaaggaga attgctggct cattttcagg agccctgccc ttcctcactg tggatgggtg 10140
 gttgtggaaa cccggtcagg taatgatagt ggcaggaggc agtcaaagtc ccaggcagat 10200
 aggggtgggt acctggtgaa acccaacctt aaagctgaag acagtcccgg ctaaattctc 10260
 atactgaatt gagaacctgt ctcccatatt ggtgtgcttt cctccgattg atcccaaccc 10320
 ttcacctatt ttacgtatac ctgccctttc ctaattgggt tttacactgc tgtgccacc 10380
 ttttgagtgg tgcctttgca tacttataaa tcagtcaacg tgtattcccc tattctgagc 10440
 ccataaaaga cccagactca gctgcagtga ggagagaaat caccctgctg tgggggttgg 10500
 ggaccactcc ctgcatcccc tctccactga gagctgttct tttgctcaat aaaattcttt 10560
 tctaccatc ctcacccttc aattgtcagt gtatcctcat tctttttgga ctcaggacaa 10620
 gcgctcagaa cactaaaca tgggtataag ctataataca ggcaggccaa gagggcaggg 10680
 cacctccagc agcaggccca gggctaagt agatccaggc agagggtgt cgctggctgt 10740
 ggaggtcctc agttggcaat gtggctgaga aaattcctgt gtcagtaact tgacggagaa 10800
 agtactttta aatgggttga aattaggaaa tgaatactat tccagtgtca ttttacaggt 10860
 aactggaac attccttcca ctgtaccctg gatgttacag aaactattgc gggaatgaag 10920
 gaggaccaga gagaccatgg ggtgagacag gaggatttat ttatttattt ttttgagaca 10980
 gagtctcgct ctgtcaccca ggctggagtg cagtggcgcg atctcggtc actgcaggct 11040
 ccgcccccca ggttcacgcc attcttctgc ctcagcctcc cgaggagctg ggactacaag 11100
 tgcctgccac ctcaccggc taattttttg tatttttagt agagatgggg tttcactgtg 11160
 ttagccagga tgg 11173

<210> 11

<211> 246

<212> DNA

<213> Homo sapiens

<220>

<400> 11
 tgagatgaag tctcactctg ttgcctagggc tggagtgagc tggcgcgac tcggctcact 60
 gcaacctcca cctcctgggt tcaagcgggt ctctgcctcg gcctcccgat tagctgggac 120
 tacagaatcg aagccagaaa ttcaacttag tccctcctgc cctctgattt tctccagtca 180
 gcaagctctc agccaacatg tgtggctgag tcctctctct cagctgtttt caagtttatg 240
 ggcagg 246

<210> 12
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Antisense Oligonucleotide

<400> 12
 aaagacctta agaggaggc 20

<210> 13
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Antisense Oligonucleotide

<400> 13
 aagtcaggta acaaggagca 20

<210> 14
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Antisense Oligonucleotide

<400> 14
 aagccgaaag tcaggtaaca 20

<210> 15
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Antisense Oligonucleotide

<400> 15
 tcctggagaa gggcaaagtc 20

<210> 16
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Antisense Oligonucleotide

<400> 16
 tcctgagtgc tcttcctgga 20

<210> 17
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Antisense Oligonucleotide

<400> 17
 agaccagatg gttataagtc 20

<210> 18
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Antisense Oligonucleotide

<400> 18
 cagtgacat tttctctcct 20

<210> 19
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Antisense Oligonucleotide

<400> 19
 tctggacaga ggtccagtgg 20

<210> 20
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Antisense Oligonucleotide

<400> 20
 gggactaagt tgaatttctg 20

<210> 21
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 21
cttgctgact ggagaaaatc 20

<210> 22
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 22
gttggtgag agcttgctga 20

<210> 23
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 23
gccacacatg ttggctgaga 20

<210> 24
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 24
gagagagatg actcagccac 20

<210> 25
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 25

atttcctgcc cataaacttg

20

<210> 26

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 26

cagaatggat cctgctgttg

20

<210> 27

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 27

atccattctg ctttgccact

20

<210> 28

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 28

ggagtctgga gtcttctccc

20

<210> 29

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 29

ctcccaaaca ggagtctgga

20

<210> 30

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 30
cctttgaagt gccatttttg 20

<210> 31
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 31
aagtgccttt gaagtgccat 20

<210> 32
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 32
gactgtgctg gctgttgctc 20

<210> 33
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 33
ttgtcttcct tggactgtgc 20

<210> 34
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 34
ccctatatcc accactgtgt 20

<210> 35
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 35
agggctggac cctatatcca 20

<210> 36
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 36
ctgtttcctc tagatctgcc 20

<210> 37
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 37
ccttgataaa gcctggccca 20

<210> 38
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 38
ggaggttga ctcttgata 20

<210> 39
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 39
ctccccagtt tgtgtcttct 20

<210> 40
<211> 20
<212> DNA
<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 40

gtccttgggt ttttgatgag

20

<210> 41

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 41

tttgacttcc acgtaaagcc

20

<210> 42

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 42

cgacttccaa gtaaagcctc

20

<210> 43

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 43

tgtccttaag tgtctgatga

20

<210> 44

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 44

attctgtgca tacataaggc

20

<210> 45

<211> 20

<212> DNA

<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 45
ttatcattaa agcctcgtcc

20

<210> 46
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 46
ggacttatca ttaaagcctc

20

<210> 47
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 47
gtgtgaaatg aggggtggact

20

<210> 48
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 48
gccgaaacct tctgccacac

20

<210> 49
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 49
aacaggtag gcttctgccg

20

<210> 50
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 50
gtgccctctt gtgcctaac

20

<210> 51
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 51
ctccctgcac acaaaggcac

20

<210> 52
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 52
ttaatgagag ttaacttagc

20

<210> 53
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 53
ggtgtttaat gagagttaac

20

<210> 54
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 54
actttctgca aatataaggc

20

<210> 55
<211> 20
<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 55

aaagtttcta tcctgagtgt

20

<210> 56

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 56

ctgtaccaca ttccctatac

20

<210> 57

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 57

tatgactcct ggctaaaggc

20

<210> 58

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 58

gcaatggctg aaaaagccac

20

<210> 59

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Antisense Oligonucleotide

<400> 59

ggtatctagc aatggctgaa

20

<210> 60

<211> 20

<212> DNA
 <213> Artificial Sequence

<220>
 <223> Antisense Oligonucleotide

<400> 60
 tcacacacag aatgtctcca

20

<210> 61
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Antisense Oligonucleotide

<400> 61
 tcatgcataa tcacacacag

20

<210> 62
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Antisense Oligonucleotide

<400> 62
 gtcttaccag tacagtctca

20

<210> 63
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Antisense Oligonucleotide

<400> 63
 agcaattctc cttcaggtgg

20

<210> 64
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Antisense Oligonucleotide

<400> 64
 aaaatgagcc agcaattctc

20

<210> 65

<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 65
aaccacccat ccacagtga

20

<210> 66
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 66
ggtttcaca acccaccatc

20

<210> 67
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 67
ctgggcattt gactgcctcc

20

<210> 68
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 68
ctatctgcct gggcatttga

20

<210> 69
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 69
caggtacca cccctatctg

20

<210> 70
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 70
aaggttgggt ttcaccaggt 20

<210> 71
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 71
tttagccggg actgtcttca 20

<210> 72
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 72
aattcagtat gaggatttag 20

<210> 73
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 73
accaaattggg aagacaggtt 20

<210> 74
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 74
aaaggcacca ctcaaaaggt 20

<210> 75
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 75
atttgtaagt atgcaaaggc

20

<210> 76
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 76
ggctctttat gggctcagaa

20

<210> 77
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 77
cactgcagct gagtctgggt

20

<210> 78
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 78
atttctctcc tcactgcagc

20

<210> 79
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 79
gagtgggtccc caacctccac

20

<210> 80
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 80
aacagctctc agtggagagg 20

<210> 81
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 81
agaaaagaat tttattgagc 20

<210> 82
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 82
actatgtaaa ctatttggt 20

<210> 83
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 83
gagcttctgc actgcaaaag 20

<210> 84
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 84

agcttgca^gt gagccgagat

20

<210> 85
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 85
atgcctgtaa tcccaacact

20

<210> 86
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 86
ttcgattctg ctgaagaaag

20

<210> 87
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 87
gcctaggcaa cagagtgaga

20

<210> 88
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 88
ttctgtagtc ccagctaadc

20

<210> 89
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Antisense Oligonucleotide

<400> 89
aatttctggc ttcgattctg